

GENERAL DESCRIPTION OF THE MONTREAL WATER-WORKS.

The present Water-Works were begun in the year 1853, and have been progressing from year to year to this date.

DESCRIPTION OF PRESENT WATER-WORKS—AQUEDUCT.

The present water supply of the city is taken from the river St. Lawrence, about one mile above the head of the Lachine Rapids, at a point about 37 feet above the summer level of the Montreal harbour, and brought down in an open canal or aqueduct, 26,200 feet long, to the Lachine Canal, at Gregory's Farm, where are placed the wheels and pumps hereinafter described. The dimensions of the canal or aqueduct are 20 feet wide on bottom, 40 feet wide at the water surface, and an average of 8 feet depth of water. The water perimeter of the canal is faced with stone, with interval slopes of one foot and a quarter vertical for one foot horizontal, and the profile of the bottom is about 5 inches per mile.

There is another canal or aqueduct of larger dimensions tapping the river St. Lawrence at about 3,000 feet higher up than the one above described, and joining it at 4,800 feet below its entrance, giving an additional foot of more head of water to the whole aqueduct.

The dimensions of this second aqueduct are as follows, viz.: Width at bottom, 78 feet; at water-level, 130 feet; depth of water, 14 feet; inclination of bottom, 2½ inches per mile; side slopes from bottom to three feet below surface of water, two feet horizontal to one vertical; from three feet below surface of water to four feet above it, 1½ foot horizontal to one vertical; from this last point to top of bank, two feet horizontal to one vertical. The portion of the side slopes with the inclination of 1½ to one is lined with a heavy, dry stone wall. A still water basin, 600 feet long by 400 feet wide, built in the St. Lawrence, forms the entrance to this second canal. The water in these canals or aqueducts is controlled by two sets of regulating gates—one set placed at the entrance of the smaller aqueduct, and the other on the large one, near its junction with the small one. Two stone bridges and a third bridge of stone and iron are built over these aqueducts at their crossing with public roads.

PUMPING APPARATUS—WATER-WHEEL.

At Gregory's Farm, the lowest extremity of the aqueduct, near the city limits, are placed the pumping works, consisting of water-wheels and steam engines. The water machinery consists of three water-wheels and six pumps, that is, two turbines and one breast wheel, with each two pumps, with a total capacity of ten millions of imperial gallons per twenty-four hours.

The whole of these wheels and pumps are enclosed in a substantial stone building of Grecian style of architecture.

TAIL RACE.

The water from the wheels is returned to the St. Lawrence about half a mile above the Victoria Bridge, into an open tail race, 3,500 feet long. The water fall from the aqueduct into the tail race is 17 feet.

STEAM PUMPING APPARATUS.

The steam machinery consists of three steam engines, with six pumps, that is, one compound beam engine (rotary) with two pumps, one low-pressure rotary beam engine, with two cylinders, one at each end of the beam, and two pumps. One Worthington duplex compound direct-acting horizontal engine, with also two pumps. All these engines are double-acting. The two first mentioned are each of a capacity of three million imperial gallons per twenty-four hours; the Worthington, of eight million imperial gallons per twenty-four hours. The Engine-House buildings are built in brick on stone foundations, and are placed at about 100 feet west of the wheel-house above described.

PUMPING MAINS.

From the pumping works the water is forced into a reservoir built on the slope of Mount Royal Mountain, through three pumping mains, one of 30 inches internal diameter, and two of 24 inches internal diameter, and 14,100 feet long. The route of these mains is as follows: The 30-inch flows through Atwater Avenue from the pumping works to Sherbrooke street, passing under the Lachine Canal, where it is laid in duplicate—and at the crossing of St. Catherine street it is connected with the city mains—then runs along Sherbrooke street to Papineau road.

At the crossing of Sherbrooke and McGill College avenue it is connected to the two 24-inch mains going up to the reservoirs. Connections are also made with all the city mains east of McGill College avenue. The two 24-inch mains from the pumping works follow also Atwater Avenue to St. Catherine street, passing also under the Lachine Canal, then turning into St. Catherine street and following that street up to McGill College avenue, where they are branched off into four branches, following McTavish Reservoir, connecting at Sherbrooke street with the 30-inch main as above mentioned, and with the 12-inch main of Sherbrooke street. The two other branches follow St. Catherine street, eastward, and unite into one single 24-inch a few hundred feet past McGill College avenue. At Phillips square, this single 24-inch main is subdivided into one 16-inch, one 12-inch, and two 6-inch mains. The 16-inch runs down Beaver

Hall to McGill street, and along McGill street to William street, connecting with the city mains at Dorchester, Lagachetiere, Craig, St. James, Notre Dame and William streets. The 12-inch main distributes water along St. Catherine street, and the 6-inch along Beaver Hall and Radegonde street.

RESERVOIR.

The reservoir is placed on McTavish street at an elevation of 204 feet above the level of the water in the Montreal harbour, or about 166 feet above the level of the water of the aqueduct at the Wheel House. It is 24 feet deep, dug out of the solid rock, and is divided into two compartments by a strong wall of masonry. The contents are about thirty-six and a half millions of imperial gallons when full.

DISTRIBUTION PIPES.

The water is distributed into the city both directly from the reservoir and the pumping mains and through various mains, whose total length is 131 miles.

The number of hydrants for fire purposes is 823, and the total number for house services is 25,123; and the daily consumption of water is at present up to 9,091,131 of imperial gallons.

HIGH LEVEL SERVICE.

At the McTavish reservoir is placed another engine house, with a high-pressure Worthington duplex steam-pumping apparatus, of the capacity of half a million of imperial gallons per 24 hours. The water is forced from the McTavish reservoir to a smaller reservoir placed in the Mount Royal Park, at the head of Peel street, 218 feet above the level of the McTavish reservoir. This reservoir, which is called the High Level Reservoir, contains, when full, about two millions of imperial gallons. A 12-inch main from the engine-house carries the water to this reservoir by following McTavish street to Pine Avenue, then Pine Avenue to Peel street, where it is divided in two branches of 12-inch main each, one going up Peel street to the High Level Reservoir, and the other running all along Pine Avenue, westward, as far as Guy street, and eastward as far as University street, connecting with all the main pipes crossing Pine Avenue, so that all the houses above the level of Sherbrooke street, on the slope of the Mountain, are supplied from this reservoir.

FOOT NOTES.

MEDICINAL EFFECTS OF ONIONS.—A mother writes to an English agricultural journal as follows: "Twice a week—and it was generally when we had cold meat minced—I gave the children a dinner which was hailed with delight and looked forward to. This was a dish of boiled onions. The little things knew not that they were taking the best of medicine for expelling what most children suffer from—worms. Mine were kept free by this remedy alone. It was a medical man who taught me to eat boiled onions as a specific for a cold in the chest. He did not know at this time, till I told him, that they were good for anything else." The editor of the journal adds: "A case is now under our own observation in which a rheumatic patient, a severe sufferer, finds great relief from eating onions freely, either cooked or raw. He asserts that it is by no means a fancy, and he says so after having persistently tried Turkish baths, galvanism, and nearly all the potions and plasters that are advertised as certain alleviators or cures."

NERVES AND LITERARY WORK.—Literary composition of any kind very frequently exercises a most depressing influence upon the mind of the writer, independent of any effect it may have on the reader. Writing is, as everybody knows, unnatural, purely artificial, and it is not strange, therefore, that it should in many cases produce melancholy even by anticipation. A few days since a girl of twelve or thirteen, attending school in a town in Northern Illinois, became so distressed because she had to write a composition, that she attempted to drown herself in a cistern, and nearly succeeded. A medical student of Baltimore having a thesis to prepare not long since, grew so morbid that he swallowed an ounce of laudanum, declaring he would rather die than do the hateful work. A bookbinder of Rouen, who was sent to the Paris Exposition, his expenses having been paid out of a lottery fund, found on his return home that he was expected to draw up a report of what he had seen. This rendered him wretched, and though his friends tried to comfort him, and offered to do the writing for him, the thing so weighed upon his mind that he waxed gloomy and morose, disappeared from his home, and his body was soon discovered in the Seine. Authors are often discontented, irritable, sullen and saturnine when engaged in composition, and many of them have doubtless become dissipated and gone to the bad generally, on account of their calling. The mere process of composition brings the nerves to the surface, unduly excites the sensibilities, and, habitually followed, has a tendency to cause morbidity and certain mental disorder. To be perfectly healthy in body and mind, a man should turn his thoughts outward, be much out of doors, and feed on the sunshine.

AN INCIDENT OF GETTYSBURG.—On the afternoon of the first day's fighting at Gettysburg, General Gordon's rebel command struck the eleventh corps of the Union army, and General Barlow, commander of the division, fell danger-

ously, and it was thought mortally wounded. He was shot directly through the body. Two of his men attempted to bear him through that shower of lead from the field; but one was instantly killed, and General Barlow magnanimously said to the other: "You can do me no good; save yourself if you can." Gordon's brigade of Georgians, in its wild charge, swept over him, and he was found by General Gordon himself, lying with upturned face in the hot July sun, nearly paralyzed and apparently dying. General Gordon dismounted from his horse, gave him a drink of water from his canteen, and inquired of General Barlow his name and wishes. General Barlow said: "I shall live probably but a short time. Please take from my breast pocket the packet of my wife's letters and read one of them to me," which was done. He then asked that the others be torn up, as he did not wish them to fall into other hands. This Gen. Gordon did, and then asked, "Can I do anything else for you, general?" "Yes," replied Gen. Barlow, earnestly. "My wife is behind our army; can you send a message through the lines?" "Certainly, I will," said Gordon, and he did. Then directing General Barlow to be borne to the shade of a tree at the rear, he rode on with his command. The wife received the message, and came harmlessly through both lines of battle and found her husband, who eventually recovered.

Since General Gordon's election to the United States Senate, both he and General Barlow were invited to a dinner party in Washington, and occupied opposite seats at the table. After introductions General Gordon said: "General Barlow, are you related to the officer of your name who was killed at Gettysburg?" "I am the man," said Barlow. "Are you related to the Gordon who is supposed to have killed me?" "I am the man," said General Gordon. The hearty greeting which followed the touching story, as related to the interested guests by General Barlow, and the thrilling effect upon the company, can better be imagined than described.

RULES FOR HUSBANDS.—Don't think when you have won a wife that you have got, also, a slave.

Don't think that your wife has less feeling than your sweetheart. Her relationship to you is simply changed—not her nature.

Don't think that you can dispense with all the little civilities of life towards her on marriage. She appreciates these things quite as much as other women.

Don't be gruff and rude at home. Had you been that sort of fellow before marriage, the probabilities are that you would be sewing on your buttons still.

Don't make your wife feel incumbent on you by giving her grudgingly. What she needs give as cheerfully as if it were a pleasure for you to do so. She will feel much better, and so will you.

Don't meddle with the affairs of the house under her charge. You have no more right to be poking your nose into the kitchen, than she has to walk into your place of business and give directions to your employees.

Don't find fault with her extravagance in ribbons, &c., while you waste money on cigars, tobacco, whiskey, &c.

Don't leave your wife at home to nurse the children, on the score of economy, while you go to theatres and spend money at billiards.

Don't bolt your supper, and then hurry off to spend your evenings away from your wife. Before marriage you couldn't spend your evenings enough with her.

Don't prowl about till midnight, wasting your time in culpable idleness, leaving your wife lonely at home to brood over your neglect and her disappointment.

Don't think that the woman whom you have solemnly promised to "love, cherish and protect," becomes a servant for you as her part of the contract.

Don't think that board and clothes are sufficient for all that a wife does for you.

Don't expect a wife to love and honour you if you prove to be a brute, and unworthy of her love and honour.

Don't cross your wife in public, and then snarl and growl at her when you are in private. This proves that you are a hypocrite.

Don't wonder that your wife is not as cheerful as she used to be, when she labours from early morn till late at night to pander to the comfort and caprice of a selfish pig who has not soul enough to appreciate her.

A CARD.

To all who are suffering from the errors and indiscretions of youth, nervous weakness, early decay, loss of manhood, &c., I will send a recipe that will cure you, FREE OF CHARGE. This great remedy was discovered by a missionary in South America. Send a self-addressed envelope to the REV. JOSEPH T. INMAN, Station D, Bible House, New York City.

NOTICE TO LADIES.

The undersigned begs respectfully to inform the ladies of the city and country that they will find at his Retail Store, 196 St. Lawrence Main Street, the choicest assortment of Ostrich and Vulture Feathers, of all shades; also, Feathers of all descriptions repaired with the greatest care. Feathers dyed as per sample, on shortest delay. Gloves cleaned and dyed black only. J. H. LEBLANC. Works: 547 Craig St.

JEALOUSY is the worst of all evils, yet the one that is the least pitied by those who cause it. The only perfect Fitting Shirt made in Canada is made by TREBLE, of Hamilton. Send for samples and cards for self-measurement. Six A Number One Shirts for \$12.

It is valueless to a woman to be young unless pretty, or to be pretty unless young. If you want a first-class shrunk Flannel Shirt, send for samples and card for self-measurement, to TREBLE'S, 8 King Street E., Hamilton, Ont.

OUR CHESS COLUMN.

Solutions to Problems sent in by Correspondent will be duly acknowledged.

TO CORRESPONDENTS.

J. W. S., Montreal.—Letter, &c., received. Many thanks.

J. B., Montreal.—Score of game received. Many thanks.

Student, Montreal.—Correct solution of Problem No. 214 received.

R.F.M., Sherbrooke, P.Q.—Correct solution of Problem for Young Players, No. 211 received.

E.H., Montreal.—Solution of Problem for Young Players No. 212 received. Correct.

H. and J. McG., Cote des Neiges.—Correct solutions received of Problem for Young Players, No. 211.

A member of the Quebec Chess Club has kindly forwarded us the annexed extract from the *Chronicle* of that city, and we are glad to insert it, as it is strong evidence of the interest taken in the Royal game in the ancient capital.

We have not heard the results of the contest of the 27th ult., but should they reach us they shall receive timely notice.

(From the Quebec Chronicle Feb. 27th, 1879.)

CHESS.—We would direct the attention of all lovers of the royal game to the advertisement announcing a renewal of the battle between the Greeks and Trojans to take place in the Chess Club Rooms, on Thursday evening, the 27th instant, at 7 p.m. The President's medal has been won by Mr. E. B. Holt, and the 2nd prize by Mr. D. C. MacKellie. The following players competed in the first class:—Messrs. F. H. Andrews, E. Blakiston, Dr. Bradley, E. Burke, C. P. Champion, E. T. Fletcher, E. B. Holt and E. Pope. In the second class:—Messrs. W. R. Dean, E. C. Fry, G. C. Hossack, M. LaFaire and D. C. MacKellie. The concluding game between Messrs. Holt and MacKellie, in which the latter received the odds of the pawn and move, was one of the best contested games in the tourney, and was only won by Mr. Holt after five hours' hard fighting. Mr. MacKellie holding the advantage of the pawn till within half an hour of the close of the game. Both gentlemen are to be congratulated on their play throughout, as neither lost a game in the class in which he entered. Mr. MacKellie winning all his, and Mr. Holt drawing two and winning the remainder of his games.

PRESIDENT GREVY AS A CHESS PLAYER.

(From the Paris Continental Gazette.)

French chess amateurs of all parties will probably rejoice at the political elevation of a gentleman who has belonged to the brotherhood of chess players for more than thirty years. M. Grévy, the newly-elected President of the French Republic, is a player of more than average force, and has devoted a great deal of time and attention to this mental exercise. He was a warm supporter of chess matches and tournaments, and took a prominent part in promoting the last International Chess Congress, held during the Exhibition. During the Empire, when M. Grévy had retired from all political activity, he was an almost daily visitor at the Café de la Régence; and the frequenters of that ancient home of French Chess will have occasion to be specially proud of the new President, for this is the second time that a comparatively unknown habitué of that establishment has risen to the highest political honour in France. It is on record that the Emperor Napoleon I., while only a Lieutenant in the army during the Reign of Terror, was in the habit of playing chess at the Café de la Régence; and the old table which he had used is still exhibited in one of the rooms of that café.

(From Land and Water.)

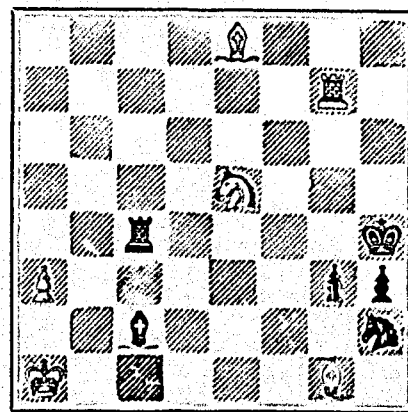
We understand that a handicap tournament, consisting of the very large number of sixty-four entries, is now in progress at the Manchester Athenæum Chess Club. It commenced early in November, with five classes handicapped according to their strength, and it speaks well for the regulations in force that there are now only six players left. Four prizes are given of the value of £35, £25, £15, £10, and £5. Mr. Higginbotham, the Honorary Secretary of the Manchester Athenæum Club, has reason to be proud of having accomplished such a feat as to launch a "chessboard tournament."

PROBLEM No. 216.

(From Chess Problems.)

By Rev. A. Cyril Pearson.

BLACK.



WHITE

White to play and mate in three moves.